Navy Advancement Center
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Advancement Handbook for Machinist's Mate (Surface)

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PREFACE

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the MM (SURFACE) rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are cumulative; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the *"Exam Expectations"* section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

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Advancement Handbook for MM3 (Surface)

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain pumps**
Knowledge you should have to perform this skill:	Identify the procedures used to operate pumps during: • Alignment • Starting • Stopping • Securing Recognize the following aspects of pump operation: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 503, Pumps, NAVSEA S9086-RH-STM-010 • Machinist's Mate 3&2 (Surface), NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the operation, theory, and maintenance of centrifugal pumps, propeller pumps, variable-stroke pumps, reciprocating pumps, positive-displacement rotary pumps, and eductors to include applicable safety precautions.

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General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain ships fuel oil and lube oil systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain fuel oil and lube oil systems during: • Alignment • Securing Recognize the following areas of fuel oil and lube oil system maintenance and operation: • Equipment parameters • System interrelationship • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541, Ship Fuel and Fuel Systems, NAVSEA S9086-SN-STM-010 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems, NAVSEA S9086-H7-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the operation and maintenance of the following systems: fuel oil/lube oil system; ship fuel/lube oil filling; transfer systems and storage; ship fuel oil/lube oil service systems; cargo oil systems (systems carrying fuel for ship propulsion); oil service systems; strainers, purification systems, separators, and oily waste water systems; and stripping systems.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain main and auxiliary boilers**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain main and auxiliary boilers during: • Alignment • Light off • Adjusting • Securing Recognize the following areas of main and auxiliary boilers: • Equipment parameters • System interrelationship • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater– Water Chemistry, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • NSTM, Chapter 554, Forced Draft Blowers, NAVSEA S9086-S2-STM-000 • Repair and Overhaul, Main Propulsion Boilers, Volume 1/Volume 2, S9221-C1-GTP-010/020 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on boiler design, theory, and construction. You can also expect questions on the maintenance and operating principles for the following systems/ components: forced draft blowers, blowdown systems, injection systems, superheaters, desuperheaters, steam atomization, steam smothering system, burner barrels and their fittings, firebricks, refractorys, boiler tubes, sootblowers, sliding feet, boiler internal fittings, manholes and handholes, air casings, air registers, and gauge glasses.

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General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain main engine**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain the main engine during: • Alignment • Warm up • Operation • Securing Recognize the following areas of main engine operation and maintenance: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, S9086-G9-STM-010 • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components, NAVSEA S9086-HK-STM-010 • NSTM, Chapter 243, Propulsion Shafting, NAVSEA S9086-HM-STM-010 • NSTM, Chapter 244, Propulsion Bearings and Seals, NAVSESA 9086-HN-STM-010 • NSTM, Chapter 245, Propellers, NAVSEA S9086-HP-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you	You can expect questions on the construction, operation, and maintenance of the following components: main engine turbines, jacking

answer exam questions correctly:	gears, shafts and their components, stern tubes and their components, reduction gears, and propellers.

General MM3 *skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain feedwater, distillate, potable water, brominators, makeup feed, chill water and fresh water drain collecting tank systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain feedwater, distillate, potable water, brominators, makeup feed, and fresh water drain collecting tank systems during: • Alignment • Starting • Stopping • Securing Recognize the following areas of feedwater, distillate, potable water, broninators, makeup feed, and fresh water drain collecting tank systems: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 531, Desalination Low-Pressure Distilling Plants, Volume 1, NAVSEA S9086-SC-STM-010 • NSTM, Chapter 531, Desalination Vapor-Compression Distilling Plants, Volume 2, NAVSEA S9086-SC-STM-020 • NSTM, Chapter 533, Potable Water Systems, NAVSEA S9086-SE-STM-010 • NSTM, Chapter 220, Boiler Water/Feedwater– Water Chemistry, Volume 1, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 220, Boiler Water/Feedwater– Test and Treatment,

	Volume 2, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement and function, flow paths, pressure control, indicators, salinity-control, cleaning procedures, chemical test and treatment, sample taking, maintenance and operation.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain heat exchangers**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain heat exchangers during: • Alignment • Operation • Securing Recall the areas of maintaining and operating heat exchangers: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • NSTM, Chapter 255, Volume 2, Feedwater Systems and Apparatus– Deaerating Feed Tanks, NAVSEA S9086-HZ-STM-020 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement and function, flow paths, pressure control, indicators, salinity control, cleaning procedures, chemical test and treatment, and sample taking. You can also expect questions on the maintenance and operation of heat exchangers, air ejection systems, DFTs, and condensers.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain heating, ventilating, air conditioning, and refrigeration systems**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance of heating, ventilating, air conditioning, and refrigeration systems to include their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating heating, ventilating, air conditioning, and refrigeration systems: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships, NAVSEA S9086-RQ-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect questions on their maintenance and operation to include safety precautions.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain remote auxiliary equipment**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance of remote auxiliary equipment to include their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating remote auxiliary equipment: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 551, Compress Air Plants and Systems, NAVSEA S9086-SY-STM-010 • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control), NAVSEA S9086-S4-STM-010 • NSTM, Chapter 562, Surface Ship Steering System, NAVSEA S9086-TA-STM-010 • NSTM, Chapter 581, Anchoring, NAVSEA S9086-TV-STM-010 • NSTM, Chapter 589, Cranes, NAVSEA S9086-T4-STM-010 • NSTM, Chapter 655, Laundry, NAVSEA S9086-V4-STM-000, • NSTM, Chapter 772, Cargo and Weapons Elevators, NAVSEA S9086-ZN-STM-010 • Machinist's Mate (Surface) 3&2,

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect questions on the maintenance and operation of air compressors and compressed air systems, hydraulic steering systems, conveyors, anchor windlasses, capstans, boat davits, winches, laundry equipment, galley equipment, mess deck equipment, scullery equipment, and ships' whistle.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain control devices**
Knowledge you should have to perform this skill:	Identify the procedures used to operate, care for, and maintain control devices and their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating control devices: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 225, Steam Machinery Control Systems, NAVSEA S9086-G3-STM-010 • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments, NAVSEA S9086-RJ-STM-000 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect questions on the operation and maintenance of reducing stations (steam, water, air, and so forth), automatic boiler controls, feedwater control systems, and valves (diaphragm

	control, globe, gate, butterfly, ball, needle, and so forth).

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain safety devices**
Knowledge you should have to perform this skill:	Identify the procedures used to operate, care for, and maintain safety devices and their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating safety devices: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, NAVSEA S9086-G9-STM-010 • NSTM, Chapter 502, Auxiliary Steam Turbines, NAVSEA S9086-RG-STM-010 • NSTM, Chapter 503, Pumps, NAVSEA S9086-RH-STM-010 • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments, NAVSEA S9086-RJ-STM-000 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect

answer exam questions correctly:	questions on the maintenance and operation of emergency shutdown devices, pressure control, devices, temperature control devices, machinery speed-limiting devices, overspeed trips, and alarms.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain ships service turbine generators**
Knowledge you should have to perform this skill:	Identify the procedures used to operate, care for, and maintain ships service turbine generators and their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating condensers: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, NAVSEA S9086-G9-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, and casualty control. You can also expect questions on the maintenance and operation of turbines, reduction gears, condensers, controls, and bearings.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain drain systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate, care for, and maintain drain systems and their component parts during: • Alignment • Operation • Securing Recall the areas of maintaining and operating drain systems: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 079, Volume 3, Damage Control– Engineering Casualty Control, NAVSEA S9086-CN-STM-030 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control and indictors. You can also expect questions on the maintenance and operation of main drains and secondary drains.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain feedwater, steam drains, and condensate systems**
Knowledge you should have to perform this skill:	Identify the following procedures used to operate, care for, and maintain feedwater, condensate, and steam drain systems, to include their component parts during: • Alignment • Operation • Securing Recall the areas of maintaining and operating feedwater, condensate, and steam drain systems: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect questions on the maintenance and operation of low-pressure drains, high-pressure drains, main feedwater systems, and condensate systems.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain firemain, auxiliary cooling water, and main circulating systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate, care for, and maintain firemain, auxiliary cooling, water, and main circulating systems to include their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating firemain, auxiliary cooling, water, and main circulating systems: • Equipment parameters • System interrelationships • Component parts • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 555, Surface Ship Firefighting, NAVSEA S9086-S3-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, and indicators. You can also expect questions on the maintenance and operation of firemain systems, auxiliary cooling water systems, seawater service strainers, auxiliary seawater circulating systems, and main circulating systems.

General MM3 *Skill Area*	**MECHANICAL SYSTEMS MAINTENANCE/OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain steam and exhaust systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain exhaust systems to include their component parts during: • Alignment • Starting • Stopping • Securing Recall the areas of maintaining and operating steam and exhaust systems: • Equipment parameters • System interrelationships • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • NSTM, Chapter 255, Volume 2, Feedwater System and Apparatus Feed and Condensate System, NAVSEA S9086-H2-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of main steam, auxiliary steam, auxiliary exhaust, shore steam, gland seal steam, desuperheaters, and HP and LP steam drains.

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General MM3 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain feedwater, steam drains, and condensate systems**
Knowledge you should have to perform this skill:	Identify the procedures used to maintain feedwater, condensate, and steam drain systems during: • Cleaning and inspecting • Removal/replacement • Repairing • Testing Recall applicable theory and safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater– Water Chemistry, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, and maintenance of LP and HP drains, main feedwater systems, and condensate systems.

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General MM3 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain piping systems**
Knowledge you should have to perform this skill:	Identify the procedures used to maintain piping systems to include their component parts during: • Inspection, removal/replacement of flange shields and insulation/lagging • Hydrostatic testing, cleaning and inspecting, installing, and adjusting piping to include LP and HP piping and support devices • Disassembly/reassembly, cleaning and inspecting, removal/replacement of joint gaskets and expansion joints/hoses Recall applicable theory and safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 505, Piping Systems, NAVSEA S9086-RK-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, and maintenance of flanges shields, insulation/lagging, gaskets, expansion joints, flexible hoses, and HP and LP tubing.

General MM3 *Skill Area*	**FABRICATION AND MANUFACTURING**
A *skill* you are expected to perform from the General Skill Area above:	**Measure, cut, and fit gaskets, LP tubing, flange shields, lagging pads, and flexible hose assemblies**
Knowledge you should have to perform this skill:	• Identify the procedures for using hand tools and measuring tools when measuring, cutting, and fitting gaskets; LP tubing; flange shields; lagging pads; and flexible hose assemblies • Recognize the types of tools used to measure cut, and fit gaskets, tubing, flange shields, and hose assemblies to include applicable safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Use and Care of Hand Tools and Measuring Tools, NAVEDTRA 12085 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on measuring, cutting, and fitting gaskets, LP tubing, flange shields, lagging pads, flexible hose assemblies. You can also expect questions on the hand tools and measuring tools used in the process to include applicable safety precautions.

General MM3 *Skill Area*	**POLLUTION CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct spill containment and cleanup drills**
Knowledge you should have to perform this skill:	• Identify the processes and procedures used for spill containment and clean up to include pollution control equipment operation • Recognize applicable safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 593, Pollution Control, NAVSEA S9086-T8-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the Navy Pollution Abatement Program to include spill containment and cleanup procedures.

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General MM3 *Skill Area*	**TECHNICAL ADMINISTRATION**
A *skill* you are expected to perform from the General Skill Area above:	**Draw diagrams and sketches**
Knowledge you should have to perform this skill:	Identify the following information used to draw diagrams and sketches: • Processes • Procedures • Tools
References you should study to gain the knowledge you need to perform this skill:	• Blueprint Reading and Sketching, NAVEDTRA 12014 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the processes, procedures, and tools used to draw diagrams and sketches.

General MM3 *Skill Area*	**MATERIAL CASUALTY CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Perform basic engineering casualty control**
Knowledge you should have to perform this skill:	Identify the following information used in engineering casualty control exercises: • Procedures • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Operational Sequencing System (EOSS)– ship specific • NSTM, Chapter 079, Volume 3, Damage Control– Engineering Casualty Control, NAVSEA S9086-CN-STM-030 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the prevention and minimization of engineering casualties. You can also expect questions on casualty correction to machinery, electrical equipment, and piping systems to include corrective procedures and safety precautions.

General MM3 *Skill Area*	**ENGINEERING MANAGEMENT**
A *skill* you are expected to perform from the General Skill Area above:	**Record full power and economy trial data**
Knowledge you should have to perform this skill:	Identify the processes and procedures used to record full power and economy trial data in the following types of records: • Engine room/fireroom logs and records • Legal records • Operating orders
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Tests, Records, and Reports, Rev 1, NAVSEA S9086-CZ-STM-000 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the types of full power and economy trial data entries made in engine room/fireroom logs and records, legal records, engineering log, engineer's bell book, and operating orders.

General MM3 *Skill Area*	**LABORATORY MANAGEMENT**
A *skill* you are expected to perform from the General Skill Area above:	**Perform chemistry control for water, fuel oil, and lube oil**
Knowledge you should have to perform this skill:	Identify the procedures used when performing the following actions on water, fuel oil, and lube oil systems: • Drawing fluid samples • Inspecting and testing fluid samples • Preparing water treatment chemical solutions • Testing centrifuges • Testing salinity/conductivity indicators Recall the procedures used for the following actions: • Disposing of hazardous material • Stowing hazardous material • Inventorying oil lab test equipment and chemicals Recall applicable theory and safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Operational Casualty Control (EOCC)– ship specific • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems, NAVSEA S9086-H7-STM-010 • NSTM, Chapter 533, Potable Water Systems, NAVSEA S9086-SE-STM-0A0 • NSTM, Chapter 541, Ship Fuel and Fuel Systems, NAVSEA S9086-SN-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about water chemistry principles; sources and effects of contaminants; casualty control; handling and storage procedures for chemicals; sampling and testing water, fuel oil, and lube oil; safety precautions for handling chemicals; logs and records; and supply information.

General MM3 *Skill Area*	**QUALITY ASSURANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Follow proper material and material process control requirements**
Knowledge you should have to perform this skill:	Identify procedures used to accomplish proper material and material process control requirements in the following areas: • Fasteners • O-rings • Safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual, COMNAVSURF/LANT 4790.3 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the purpose of the Quality Control Program and quality control manuals to include program components, organization, levels of essentiality, and levels of assurance.

General MM3 *Skill Area*	**CORROSION CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct and monitor boiler lay-ups**
Knowledge you should have to perform this skill:	Identify the procedures to follow when accomplishing the following types of lay-ups on naval boilers: • Steam blanket • Hot deaerated • Desiccant • Hot air • Hydrazine/morpholine Recall applicable theory and safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • Machinist's Mate (Surface) 3&2, NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the documentation, selection, and comparison of lay-ups; lay-up methods; and time limits for lay-ups. You can also expect questions on applicable theory and safety precautions.

Part 2

Advancement Handbook for MM2 (Surface)

Advancement Handbook for MM2 (Surface)

General MM2 *Skill Area*	**MECHANICAL SYSTEMS OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain main and auxiliary boilers**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain main and auxiliary boilers during: • Alignment • Light off • Adjustment • Securing Recognize equipment parameters Recognize system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • NSTM, Chapter 554, Forced Draft Blowers, NAVSEA S9086-S2-STM-000 • Repair and Overhaul, Main Propulsion Boilers, Volume 2, S9221-C1-GTP-010/020
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on boiler design, theory, construction, maintenance, and operating principles. You can also expect questions on modes of control (ABC, manual, etc.) and boiler inspections, to include applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL SYSTEMS OPERATION**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain brominators, CHELANT and distilling systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain brominators, CHELANT and distilling systems during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 531, Volume 1, Low Pressure and Vapor Compression, NAVSEA S9086-SC-STM-010 • NSTM, Chapter 531, Volume 2, Desalination Distilling Plants, NAVSEA S9086-SC-STM-010 • NSTM, Chapter 533, Potable Water Systems, NAVSEA S9086-SE-STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Water Chemistry, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement and function, flow paths, pressure control, indicators, salinity control, cleaning procedures, chemical test and treatment, sample taking, maintenance and operation. You can also expect questions on

	applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Operate and maintain pumps**
Knowledge you should have to perform this skill:	Identify the following procedures used to operate pumps during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Operational Sequencing System (EOSS)– ship specific • NSTM, Chapter 503, Pumps, NAVSEA S9086-RH-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the operation, theory, and maintenance of centrifugal pumps, propeller pumps, variable-stroke pumps, reciprocating pumps, positive-displacement rotary pumps, and eductors. You can also expect questions on applicable safety precautions.

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General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain remote auxiliary equipment**
Knowledge you should have to perform this skill:	Identify the following procedures used in the operation, care, and maintenance of remote auxiliary equipment to include their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 589, Cranes, NAVSEA S9086-T4-STM-010 • NSTM, Chapter 581, Anchoring, NAVSEA S9086-TV-STM-010 • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control), NAVSEA 9086-S4-STM-010 • NSTM, Chapter 562, Surface Ship Steering Systems, NAVSEA S9086-TA-STM-010 • NSTM, Chapter 551, Compress Air Plants and Systems, NAVSEA S9086-SY-STM-010 • NSTM, Chapter 655, Laundry, NAVSEA S9086-V4-STM-000 • NSTM, Chapter 772, Cargo and Weapons Elevators, NAVSEA S9086-ZN-STM-010
Exam Expectations. These	You can expect questions on component

are subject areas you should know to help you answer exam questions correctly:	arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of air compressors and compressed air systems, air dryer systems, hydraulic steering systems, conveyors, anchor windlasses, capstans, boat davits, winches, laundry equipment, galley equipment, mess deck equipment, scullery equipment, and the ship's whistle. You can also expect questions about applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain ships fuel oil and lube oil systems**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain fuel oil and lube oil systems during: • Alignment • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 541, Ship Fuel and Fuel Systems, Rev 1, NAVSEA S9086-SN-STM-010 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems, NAVSEA S9086-H7-STM-010 • NSTM, Chapter 593, Pollution, NAVSEA S9086-T8-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions from the following about fuel oil/lube oil system operation and maintenance: ship fuel/lube oil filling; transfer systems, and storage, ship fuel oil/lube oil service systems; cargo oil systems (systems that carry fuel for ship propulsion); oil service systems; strainers; purification systems, separators, and oily waste water systems; and stripping systems. You can also expect questions about applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain shafting and jacking gear**
Knowledge you should have to perform this skill:	• Identify the procedures used to maintain main propulsion shafting and jacking gear • Recognize equipment parameters • Recall system interrelations • Identify component parts • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 243, Propulsion Shafting, NAVSEA S9086-HM-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the construction, operation, and maintenance of jacking gears, shafts and their components, stern tubes and their components. You can also expect questions of applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain ships service turbine generators**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance for ships service turbine generators and their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, NAVSEA S9086-G9-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of turbines, reduction gears, types of units, controls, bearings, and casualty control.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain safety devices**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance for safety devices and their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 503, Pumps, NAVSEA S9086-RH-STM-010 • NSTM, Chapter 504, Pressure Temperature and Other Mechanical and Electromechanical Measuring Instruments, NAVSEA S9086-RJ-STM-000 • NSTM, Chapter 502, Auxiliary Steam Turbines, NAVSEA S9086-RG-STM-010 • NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, NAVSEA S9086-G9-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of emergency shutdown devices, pressure control devices, temperature control devices, machinery speed-limiting devices, overspeed trips, alarms, and salinity indicators.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain heating and air-conditioning systems**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance for heating, ventilating, air conditioning, and refrigeration systems to include their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships, NAVSEA S9086-RQ-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of heating systems. You can also expect questions about applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain heat exchangers**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain heat exchangers during: • Alignment • Operation • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater– Water Chemistry, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • NSTM, Chapter 255, Volume 2, Feedwater System and Apparatus Feed and Condensate System, NAVSEA S9086-HZ-STM-020
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement and function, flow paths, pressure control, indicators, salinity-control, cleaning procedures, chemical test and treatment, sample taking, maintenance, and operation of heat exchangers, air ejector systems, and DFTs. You can also expect questions about applicable safety precautions.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain control devices**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance of control devices and their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 225, Steam Machinery Control Systems, NAVSEA S9086-G3-STM-010 • NSTM, Chapter 504, Pressure Temperature and Other Mechanical and Electromechanical Measuring Instruments, NAVSEA S9086-RJ-STM-000 • Valves, Traps, and Orifices, Volume 1, S9253-AD-MMM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of reducing stations (steam, water, air, etc.) and feedwater control systems.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain condensate systems**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance for feedwater, condensate, and steam drain systems and their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of condensate systems.

General MM2 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain gland sealing systems**
Knowledge you should have to perform this skill:	Identify the procedures used in the operation, care, and maintenance for steam and exhaust systems to include their component parts during: • Alignment • Starting • Stopping • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-HY-STM-010 • NSTM, Chapter 255, Volume 2, Feedwater System and Apparatus Feed and Condensate System, NAVSEA S9086-HZ-STM-020
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on component arrangement, function, flow paths, pressure control, indicators, maintenance, and operation of gland seal steam systems.

General MM2 *Skill Area*	**TECHNICAL ADMINISTRATION**
A *skill* you are expected to perform from the General Skill Area above:	**Review and update records, logs, and reports**
Knowledge you should have to perform this skill:	• Identify processes and procedures used to maintain administration materials.
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Tests, Records and Reports, NAVSEA S9086-CZ-STM-000 0901-LP-090-0010 • NSTM, Chapter 220, Boiler Water/Feedwater– Test and Treatment, Volume 2, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • Machinist's Mate 3&2 (Surface), NAVEDTRA 12146
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about legal records, operating records, maintenance records, accounts, and miscellaneous records.

General MM2 *Skill Area*	**MATERIAL CASUALTY CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct basic engineering casualty control exercises**
Knowledge you should have to perform this skill:	Identify the procedures used when conducting basic engineering casualty control exercises during: • Prevention • Minimization • Connection • Restoring Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Operational Sequencing System (EOSS)– ship specific • Engineering Operational Casualty Control (EOCC)– ship specific • NSTM, Chapter 079, Volume 3, Damage Control Engineering Casualty Control, NAVSEA S9086-CN-STM-030
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on the prevention, minimization, and correction of operational and battle casualties to machinery, electrical, and piping installations.

General MM2 *Skill Area*	**ENGINEERING MANAGEMENT**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct boiler flexibility tests**
Knowledge you should have to perform this skill:	Identify the procedures used to operate boilers and their associated auxiliary equipment during: • Alignment • Starting • Stopping • Adjusting • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 225, Rev 1, Steam Machinery Control Systems, NAVSEA S9086-G3-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about Level 1 criterion, performance requirements, and pretest conditions.

General MM2 *Skill Area*	**LABORATORY MANAGEMENT**
A *skill* you are expected to perform from the General Skill Area above:	**Perform chemistry control for water, fuel oil, and lube oil**
Knowledge you should have to perform this skill:	• Recognize damage to equipment and systems • Identify the procedures used to draw and test fluid samples • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubricating Systems, NAVSEA S9086-H7-STM-010 • NSTM, Chapter 533, Potable Water Systems, NAVSEA S9086-SE-STM-010 • NSTM, Chapter 541, Ship Fuel and Fuel Systems, Rev 1, NAVSEA S9086-SN-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about water chemistry principles, the effects of contaminants, sources of contaminants, casualty control, chemical safety precautions, handling and storage procedures, sampling and testing, logs and records, and supply information.

General MM2 *Skill Area*	**QUALITY ASSURANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Review hydrostatic test requirements for systems and equipment**
Knowledge you should have to perform this skill:	• Identify hydrostatic test requirements for systems and equipment • Recognize configuration control • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual, CINCLANTLFT/CINCPACFLTINST 4790.3 • NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about test pressures, test requirements, test preparation, and inspection standards.

General MM2 *Skill Area*	**CORROSION CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct and monitor boiler lay-ups**
Knowledge you should have to perform this skill:	Identify processes in laying up naval boilers Identify the procedures used for the following types of lay ups: • Steam blanket • Hot deaerated • Desiccant • Hot air • Hydrazine/morpholine Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about lay-up documentation, selection of lay-ups, comparison of lay-ups, lay-up methods, and time limits for lay-ups.

Part 3

Advancement Handbook for MM1 (Surface)

Advancement Handbook for MM1 (Surface)

General MM1 *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Perform inspections**
Knowledge you should have to perform this skill:	Identify the procedures used to operate and maintain main and auxiliary boilers during: • Alignment • Light off • Adjustment • Securing Recognize equipment parameters Recall system interrelations Identify component parts Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors, NAVSEA S9086-S2-STM-000 • NSTM, Chapter 554, Forced Draft Blowers, NAVSEA S9086-SX-STM-000 • Repair and Overhaul, Main Propulsion Boilers, S9221-C1-GTP-010/020
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the general causes of deterioration, inspection techniques, and damage classification.

General MM1 *Skill Area*	**TECHNICAL ADMINISTRATION**
A *skill* you are expected to perform from the General Skill Area above:	**Prepare and review logs and records**
Knowledge you should have to perform this skill:	• Identify processes and procedures used in recordkeeping
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 221, Boilers, NAVSEA S9086-GY-STM-010 • NSTM, Chapter 220, Volume 1, Boiler Water/ Feedwater– Water Chemistry, NAVSEA S9086-GX-STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/ Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-020 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubricating Systems, NAVSEA S9086-H7-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on requirement frequency, format, and submission of logs and records.

General MM1 *Skill Area*	**ENGINEERING MANGEMENT**
A *skill* you are expected to perform from the General Skill Area above:	**Review management programs**
Knowledge you should have to perform this skill:	• Identify processes and procedures used in the preparation, maintenance, and submission of all forms, records, logs, reports, and drawings, associated with inspections, tests, trials, and operations
References you should study to gain the knowledge you need to perform this skill:	• Blueprint Reading and Sketching, NAVEDTRA 12014 • Machinist's Mate 1&C (Surface), NAVEDTRA 12145 • Engineering Operational Sequencing System (EOSS)– ship specific • Engineering Operational Casualty Control (EOCC)– ship specific • NSTM, Chapter 079, Volume 3, Damage Control Engineering Casualty Control, NAVSEA S9086-CN-STM-030 • NSTM, Chapter 220, Boiler, Volume 2, Water/Feedwater– Test and Treatment, NAVSEA S9086-GX-STM-010 • NSTM Chapter 221, Boilers, NAVSEA S9086-GY-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about ships drawings, propulsion plant start-up and operations, SHIPALTS and MACHALTS, full power and economy trials, and boiler flexibility tests.

Advancement Handbook for MM1 (Surface)

General MM1 *Skill Area*	**MATERIAL CASUALTY CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct drills and procedures**
Knowledge you should have to perform this skill:	• Identify processes and procedures used to identify plant casualties • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Machinist's Mate 1&C (Surface), NAVEDTRA 12145 • Engineering Operational Sequencing System (EOSS)– ship specific • Engineering Operational Casualty Control (EOCC)– ship specific • Blueprint Reading and Sketching, NAVEDTRA 12014 • NSTM, Chapter 079, Volume 3, Damage Control Engineering Casualty Control, NAVSEA S9086-CN-STM-030
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about engineering operational casualty control.

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General MM1 *Skill Area*	**QUALITY ASSURANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Develop, monitor, and conduct quality assurance**
Knowledge you should have to perform this skill:	• Identify processes and procedures used in the quality assurance program
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual, CINCLANTFLT/CINCPACFLTINST 4790.3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about work procedures, controlled material, requisitioning and receiving material, in-process control of fabrication and repairs, testing and recertification of equipment, and documenting any departure from specifications.

Part 4

Advancement Handbook for MMC (Surface)

General MMC *Skill Area*	**MECHANICAL MAINTENANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct inspections**
Knowledge you should have to perform this skill:	• Identify inspection requirements • Identify causes of deterioration • Recall inspection techniques • Recognize procedures used to classify damage • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Tests, Records, and Reports, NAVSEA S9086-CZ-STM-000 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, NAVSEA S9086-GY-STM-010-CH221 S9086-GX-STM-020 • NSTM, Chapter 231, Propulsion and SSTG Steam Turbines, NAVSEA S9086-G9-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about general inspection requirements, causes of deterioration, damage classification, and inspection techniques.

General MMC *Skill Area*	**POLLUTION CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Observe pollution control procedures**
Knowledge you should have to perform this skill:	• Recognize pollution control regulations • Identify equipment used for pollution control • Recall the procedures for the operation and maintenance of shipboard pollution-control equipment/systems • Recognize the Navy Pollution Abatement Program
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 593, Pollution Control, NAVSEA S9086-T8-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about pollution control regulations, the Navy Pollution Abatement Program, and operation and maintenance of shipboard pollution-control equipment and systems.

General MMC *Skill Area*	**TECHNICAL ADMINISTRATION**
A *skill* you are expected to perform from the General Skill Area above:	**Review programs and procedures**
Knowledge you should have to perform this skill:	• Identify the process for reviewing/ validating EOSS manuals and EOCC • Recall fuel oil, lube oil, HAZMAT, boiler water/feedwater, hearing conservation, and heat stress programs • Identify the process for preparing/ reviewing CASREPs, SITREPs, and CASCORs • Recall the procedures used to prepare, maintain and submit records, logs, and reports for inspections/tests/trials/ operations • Recall the procedures used to maintain and submit ships drawings used with inspections, tests, trials, and operations
References you should study to gain the knowledge you need to perform this skill:	• Machinist's Mate 1&C (Surface), NAVEDTRA 12145 • Navy Occupational Safety and Health Program Manual for Forces Afloat, OPNAVINST 5100.19B • NSTM, Chapter 079, Volume 3, Damage Control Engineering Casualty Control, NAVSEA S9086-CN-STM-030 • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater– Water Chemistry, NAVSEA S9086-BX,STM-010 • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater– Test and Treatment, S9086-GX-STM-020 • NSTM, Chapter 221, Boilers, NAVSEA

	S9086-GY-STM-010 • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems, NSTM, NAVSEA S9086-H7-STM-010
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about the requirements, frequency, format, validation, and submission of EOSS manuals, HAZMAT users guides, CASREPs, SITREPs, and CASCORs. You can also expect questions about reviewing boiler tube renewal sheets. You can also expect questions about ships drawings, propulsion plant start-up and operations, SHIPALTS and MACHALTS, full power and economy trials, and boiler flexibility tests

General MMC *Skill Area*	**MATERIAL CASUALTY CONTROL**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct drills and procedures**
Knowledge you should have to perform this skill:	• Coordinate/conduct plant drills • Recognize the processes and procedures used to identify plant casualties • Recognize safety precautions
References you should study to gain the knowledge you need to perform this skill:	• Engineering Operational Sequencing System (EOSS)– ship specific • Engineering Operational Casualty Control (EOCC)– ship specific • NSTM, Chapter, 079, Volume 3, Damage Control Engineering Casualty Control, NAVSEA S9086-CN-STM-030
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about engineering operational casualty control. You can also expect questions about applicable safety precautions.

General MMC *Skill Area*	**QUALITY ASSURANCE**
A *skill* you are expected to perform from the General Skill Area above:	**Review quality assurance specifications**
Knowledge you should have to perform this skill:	• Identify processes and procedures used in the quality assurance program • Recall the procedures used for documentation
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual, CINCLANTFLT/CINCPACFLTINST 4790.3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about quality assurance to include work procedures, controlled material, requisitioning and receiving material, in-process control of fabrication and repairs, testing and recertification of equipment, and documentation for any departure from specifications.

Appendix 1

References Used in This Advancement Handbook

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
MM3 (SUR)	NAVEDTRA 12146	Machinist's Mate (Surface) 3&2	All	Note 2
	NAVEDTRA 12014	Blueprint Reading and Sketching	All	Note 2
	NAVEDTRA 12085	Use and Care of Hand Tools and Measuring Tools	All	Note 2
	EOSS	Engineering Operational Sequencing System	Ship specific	
	EOCC	Engineering Operational Casualty Control	Ship specific	
	NSTM, NAVSEA S9086-CN-STM-030	Damage Control– Engineering Casualty Control	Chapter 079, Volume 3	Note 1
	NSTM, NAVSEA S9086-CZ-STM-000	Inspections, Tests, Records, and Reports	Chapter 090, Rev 1,	Note 1
	NSTM, NAVSEA S9086-GX-STM-010	Boiler Water/Feedwater– Water Chemistry	Chapter 220, Volume 1	Note 1
	NSTM, NAVSEA S9086-GX-STM-020	Boiler Water/ Feedwater– Test and Treatment	Chapter 220, Volume 2,	Note 1
	NSTM, NAVSEA S9086-GY-STM-010	Boilers	Chapter 221	Note 1
	NSTM, NAVSEA S9086-G3-STM-010	Steam Machinery Control Systems	Chapter 225, Rev 1	Note 1
	NSTM, NAVSEA S9086-G9-STM-010	Propulsion and SSTG Steam Turbines	Chapter 231	Note 1
	NSTM, NAVSEA S9086-HK-STM-010	Propulsion Reduction Gears, Couplings, Clutches, and Associated Components	Chapter 241	Note 1
	NSTM, NAVSEA S9086-HM-STM-010	Propulsion Shafting	Chapter 243	Note 1
	NSTM, NAVSESA 9086-HN-STM-010	Propulsion Bearings and Seals	Chapter 244	Note 1
	NSTM, NAVSEA S9086-HP-STM-010	Propellers	Chapter 245	Note 1
	NSTM, NAVSEA S9086-HY-STM-010	Condensers, Heat Exchangers, and Air Ejectors	Chapter 254	Note 1
	NSTM, NAVSEA S9086-H2-STM-010	Feedwater System and Apparatus Feed and Condensate System	Chapter 255, Volume 2	Note 1
	NSTM, NAVSEA S9086-H7-STM-010	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems	Chapter 262	Note 1
	NSTM, NAVSEA S9086-RG-STM-010	Auxiliary Steam Turbines	Chapter 502	Note 1

	NSTM, NAVSEA S9086-RH-STM-010	Pumps	Chapter 503	Note 1
	NSTM, NAVSEA S9086-RJ-STM-000	Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments	Chapter 504	Note 1
	NSTM, NAVSEA S9086-RK-STM-010	Piping Systems	Chapter 505	Note 1
	NSTM, NAVSEA S9086-RQ-STM-010	Heating, Ventilating, and Air Conditioning Systems for Surface Ships	Chapter 510	Note 1
	NSTM, NAVSEA S9086-SC-STM-010	Desalination Low-Pressure Distilling Plants	Chapter 531, Volume 1,	Note 1
	NSTM, NAVSEA S9086-SC-STM-020	Desalination Vapor-Compression Distilling Plants	Chapter 531, Volume 2	Note 1
	NSTM, NAVSEA S9086-SE-STM-010	Potable Water Systems	Chapter 533	Note 1
	NSTM, NAVSEA S9086-SN-STM-010	Ship Fuel and Fuel Systems	Chapter 541	Note 1
	NSTM, NAVSEA S9086-SY-STM-010,	Compress Air Plants and Systems	Chapter 551	Note 1
	NSTM, NAVSEA S9086-S2-STM-000	Forced Draft Blowers	Chapter 554	Note 1
	NSTM, NAVSEA S9086-S3-STM-010	Surface Ship Firefighting	Chapter 555	Note 1
	NSTM, NAVSEA S9086-S4-STM-010,	Hydraulic Equipment (Power Transmission and Control)	Chapter 556	Note 1
	NSTM, NAVSEA S9086-TA-STM-010,	Surface Ship Steering System	Chapter 562	Note 1
	NSTM, NAVSEA S9086-TV-STM-010,	Anchoring	Chapter 581	Note 1
	NSTM, NAVSEAS9086-T4-STM-010	Cranes	Chapter 589	Note 1
	NSTM, NAVSEA S9086-T8-STM-010	Pollution Control	Chapter 593	Note 1
	NSTM, NAVSEA S9086-V4-STM-000	Laundry	Chapter 655	Note 1
	NSTM, NAVSEA S9086-ZN-STM-010	Cargo and Weapons Elevators	Chapter 772	Note 1
	S9221-C1-GTP-010/020	Repair and Overhaul, Main Propulsion Boilers	Volume 1/ Volume 2	Note 1
	CINCLANTFLT/CINCPACFLTINST 4790.3	Joint Fleet Maintenance Manual		Note 2
MM2 (SUR)	NAVEDTRA 12146	Machinist's Mate 3&2 (Surface)	All	Note 2
	NSTM, NAVSEA S9086-CN-STM-030	Damage Control Engineering Casualty Control	Chapter 079, Volume 3	Note 1

	NSTM, NAVSEA S9086-CZ-STM-000 0901-LP-090-0010	Inspections, Tests, Records and Reports	Chapter 090	Note 1
	NSTM, NAVSEA S9086-GX-STM-010	Boiler Water/Feedwater– Water Chemistry	Chapter 220, Volume 1	Note 1
	NSTM, NAVSEA S9086-GX-STM-020	Boiler Water/Feedwater– Test and Treatment	Chapter 220, Volume 2	Note 1
	NSTM, NAVSEA S9086-GY-STM-010-	Boilers	Chapter 221	Note 1
	NSTM, NAVSEA S9086-G3-STM-010	Steam Machinery Control Systems	Chapter 225, Rev 1	Note 1
	NSTM, NAVSEA S9086-G9-STM-010	Propulsion and SSTG Steam Turbines	Chapter 231	Note 1
	NSTM, NAVSEA S9086-HM-STM-010	Propulsion Shafting	Chapter 243	Note 1
	NSTM, NAVSEA S9086-HY-STM-010	Condensers, Heat Exchangers, and Air Ejectors	Chapter 254	Note 1
	NSTM, NAVSEA S9086-HZ-STM-020	Feedwater System and Apparatus Feed and Condensate System	Chapter 255, Volume 2	Note 1
	NSTM, NAVSEA S9086-H7-STM-010	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems	Chapter 262	Note 1
	NSTM, NAVSEA S9086-RG-STM-010	Auxiliary Steam Turbines	Chapter 502	Note 1
	NSTM, NAVSEAS9086-RH-STM-010	Pumps	Chapter 503	Note 1
	NSTM, NAVSEA S9086-RJ-STM-000	Pressure Temperature and Other Mechanical and Electromechanical Measuring Instruments	Chapter 504	Note 1
	NSTM, NAVSEA S9086-RQ-STM-010	Heating, Ventilating, and Air Conditioning Systems for Surface Ships	Chapter 510	Note 1
	NSTM, NAVSEA S9086-SC-STM-010	Desalination Low-Pressure Distilling Plants	Chapter 531, Volume 1	Note 1
	NSTM, NAVSEA S9086-SC-STM-020	Desalination Low-Pressure Distilling Plants	Chapter 531, Volume 2	Note 1
	NSTM, NAVSEA S9086-SE-STM-010	Potable Water Systems	Chapter 533	Note 1
	NSTM, NAVSEA S9086-SN-STM-010	Ship Fuel and Fuel Systems	Chapter 541, Rev 1	Note 1
	NSTM, NAVSEA S9086-SY-STM-010	Compress Air Plants and Systems	Chapter 551	Note 1
	NSTM, NAVSEA S9086-S2-STM-000	Forced Draft Blowers	Chapter 554	Note 1
	NSTM, NAVSEA 9086-S4-STM-010	Hydraulic Equipment (Power Transmission and Control)	Chapter 556	Note 1
	NSTM, NAVSEA S9086-TA-STM-010	Surface Ship Steering Systems	Chapter 562	Note 1

	NSTM, NAVSEA S9086-TV-STM-010	Anchoring	Chapter 581	Note 1
	NSTM, NAVSEA S9086-T4-STM-010	Cranes	Chapter 589	Note 1
	NSTM, NAVSEA S9086-T8-STM-01	Pollution Control	Chapter 593	Note 1
	NSTM, NAVSEA S9086-V4-STM-000	Laundry	Chapter 655	Note 1
	NSTM, NAVSEA S9086-ZN-STM-010	Cargo and Weapons Elevators	Chapter 772	Note 1
	S9221-C1-GTP-010 and 020	Repair and Overhaul, Main Propulsion Boilers	Volume 2	Note 1
	S9253-AD-MMM-010	Valves, Traps, and Orifices	Volume 1	Note 1
	CINCLANTFLT/CINCPACFLTINST 4790.3	Joint Fleet Maintenance Manual		Note 2
	EOSS	Engineering Operational Sequencing System	Ship specific	
	EOCC	Engineering Operational Casualty Control	Ship specific	
MM1 (SUR)	NAVEDTRA 12145	Machinist's Mate 1&C	All	Note 2
	NAVEDTRA 12014	Blueprint Reading and Sketching		Note 2
	EOSS	Engineering Operational Sequencing System	Ship specific	
	EOCC	Engineering Operational Casualty Control	Ship specific	
	NSTM, NAVSEA S9086-CN-STM-030	Damage Control Engineering Casualty Control	Chapter, 079, Volume 3	Note 1
	NSTM, NAVSEA S9086-CZ-STM-000	Inspections, Tests, Records and Reports	Chapter 090	Note 1
	NSTM, S9086-GX-STM-010	Boiler Water/Feedwater– Water Chemistry	Chapter 220, Volume 2	Note 1
	NSTM, NAVSEA S9086-GX-STM-020	Boiler Water/Feedwater– Test and Treatment	Chapter 220, Volume 2	Note 1
	NSTM, NAVSEA S9086-GY-STM-010	Boilers	Chapter 221	Note 1
	NSTM, NAVSEA S9086-S2-STM-000 CH 554	Forced Draft Blowers	Chapter 554	Note 1
	NAVSEA S9086-H7-STM-010	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems	Chapter 262	Note 1
	S9221-C1-GTP-010/020	Repair and Overhaul, Main Propulsion Boilers	Volume 2	Note 2
	CINCLANTFLT/CINCPACFLTINST 4790.3	Joint Fleet Maintenance Manual	All	Note 2
MMC (SUR)	NAVEDTRA 12145	Machinist's Mate 1&C (Surface)	All	Note 2
	EOSS	Engineering Operational Sequencing System	Ship specific	

	EOCC	Engineering Operational Casualty Control	Ship specific	
	OPNAVINST 5100.19B,	Navy Occupational Safety and Health Program Manual for Forces Afloat		Note 4
	NSTM, NAVSEA S9086-CN-STM-030	Damage Control Engineering Casualty Control	Chapter, 079, Volume 3	Note 1
	NSTM, NAVSEA S9086-CZ-STM-000	Inspections, Tests, Records and Reports	Chapter 090	Note 1
	NSTM, NAVSEA S9086-GX-STM-010-	Boiler Water/Feedwater– Water Chemistry	Chapter 220, Volume 1	Note 1
	NSTM, NAVSEA S9086-GX-STM-020-	Boiler Water/Feedwater– Test and Treatment	Chapter 220, Volume 2	Note 1
	NSTM, NAVSEA S9086-GX-STM-010	Boilers	Chapter 221	Note 1
	NSTM, NAVSEA S9086-G9-STM-010	Propulsion and SSTG Steam Turbines	Chapter 231	Note 1
	NSTM, NAVSEA S9086-H7-STM-010	Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems	Chapter 262	Note 1
	NSTM, NAVSEA S9086-T8-STM-01	Pollution Control	Chapter 593	Note 1
	CINCLANTFLT/CINCPACFLTINST 4790.3	Joint Fleet Maintenance Manual	All	Note 2

LEGEND:

Note 1– To order, MILSTRIP to NAVICP PHILA (Stk No. form NAVSUP P2002) or via INTERNET http://www.nll.navsup.navy.mil

Note 2– INTERNET http://www.submepp.navy.mil/PRODSERV.HTM

Note 3– Fleet Publications Library CD-ROM: Ltr request to: Commanding Officre, Attn: CD-ROeam Code N911, NCTAMS LANT, 9625 Moffett Ave, Norfolk, VA 23511-2784

Note 4— INTERNET –http://www.submepp.navy.mil/PRODSERV.THM